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- a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
- b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite, wherein said discrete islands of metal are encapsulated by said thermoplastic layers;
- c) depositing a metal onto the metallized composite to form a second discontinuous layer of metal; and
- d) laminating a third thermoplastic layer onto said second discontinuous layer.

Amendments to the claims are indicated in the attached "Marked Up Version of Amendments" (pages i - iv).

REMARKS

The remainder of this amendment is set forth under appropriate sub-headings for the convenience of the Examiner.

Applicant's Invention

Applicant's claimed method, as amended, is directed to forming a metallized composite, including the step of depositing a metal on a first thermoplastic layer to form a discontinuous layer of metal, the discontinuous layer being formed of discrete islands of metal. A second thermoplastic layer is laminated onto the discontinuous layer to form the metallized composite.

Advantages of Applicant's Invention

Applicant's claimed invention has several advantages. For example, in forming the discontinuous metal layer of discrete metal islands, the need for etching to minimize the amount of metal between islands in order to improve adhesion between the first and second layers can be significantly reduced or eliminated. Reduction or elimination of etching, in turn, can significantly improve the appearance of finished parts, such as mirrors. Further, reflective surfaces formed by discontinuous layers of discrete metal islands laminated between thermoplastic layers are flexible and can be applied to apparel, footwear, and other applications, while providing the appearance of being perfectly reflective.

Amendments

Claims 1, 6, 7, 9-14, 17, 19, 24, and 25 have been cancelled.

Claims 2-5, 8, 15, 18, 20, 22, and 23 have been amended, as necessary, to incorporate the subject matter of their respective base claims and any intervening claims. Support for these amendments can be found throughout the specification and originally filed claims.

As discussed with the Examiner, Claims 21 and 26 have been amended to incorporate the subject matter of their respective base claims, and to add the phrase "wherein said discrete islands of metal are encapsulated by said thermoplastic layers." Support for these amendments can be found throughout the specification, figures, originally filed claims, and more specifically at page 6, lines 20-23; page 9, lines 6-10; Figure 1; and Figure 2.

No new matter has been introduced.

Objection to Claims 2-5, 8, 15, 16, 18, 20, 22, and 23

In the Final Action mailed March 18, 2003, the Examiner objected to Claims 2-5, 8, 15, 16, 18, 20, 22, and 23 as being dependent upon rejected base claims. However, the Examiner stated that those claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant disagrees with the Examiner's rejection of the respective base and intervening claims. However, solely to speed prosecution, Applicant has amended Claims 2-5, 8, 15, 18, 20, 22, and 23 as suggested. Claim 16 has not been amended directly, however, Claim 16 is dependent from Claim 15 which has been amended as suggested by the Examiner. Applicant believes those claims are now in condition for allowance and respectfully requests that the objection be withdrawn.

Rejection of Claims 1, 6, 7, 9-14, 17, 19, 21, and 24-26

In the Final Action mailed March 18, 2003, the Examiner rejected Claims 1, 6, 7, 9-14, 17, 19, 21, and 24-26.

Without agreeing with Examiner's basis for rejection of those claims and solely to speed prosecution, Applicants have cancelled Claims 1, 6, 7, 9-14, 17, 19, 24, and 25.

Rejection of Claims 21 and 26 under 35 U.S.C. § 103(a) over Bayer

Claims 21 and 26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. 5,277,734, issued to Bayer (hereinafter "Bayer"). The Examiner stated that Bayer discloses a method of making a multi-layer flexible electric conductive circuit that includes transferring

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circuit traces to a base material of a flexible plastic sheet, and then applying an insulating sheet over the circuit traces to thereby form a discontinuous layer of metal deposited on a thermoplastic layer to form a metallized composite, as claimed by Applicant. The Examiner views the circuit traces as "discrete islands of metal" because they are isolated from each other.

Bayer is directed to a method for forming an electrically-conductive circuit sheet. The method includes depositing conductive circuit traces or strips by lamination on insulating base materials. The electrically conductive strips have terminals. As stated at Col. 2, line 62 through Col. 3, line 5 of Bayer:

Referring now to the drawings, and more particularly to FIG. 1, there is shown generally at 10, a conductive circuit constructed in accordance with the present invention. The conductive circuit is comprised of flat conductive circuit traces or strips 11, which are made of thin conductive sheet material, herein thin conductive foil, such as 0.013 mm thick foil. These strips 11 are each provided with terminals 12 and have an adhesive backing surface 13 to adhesively retain same on an insulating base material 14. The strips may also have terminals 12 formed integrally therewith.

Additional layers can be deposited over the circuit strips. The method disclosed by Bayer forms an electrically conductive circuit.

While Applicant does not agree that the circuit traces recited in Bayer are "discreet islands of metal" as recited in the rejected claims, Applicant has amended Claims 21 and 26 to recite that the discreet islands of metal are "encapsulated" by the thermoplastic layers, as discussed during the telephone interview of June 11, 2003. Even if the circuit traces in Bayer are viewed as "discreet islands of metal," they are not encapsulated because the two terminals of each circuit must be exposed so that they may carry a current. In the telephone interview, the Examiner agreed that Bayer does not teach or suggest discreet islands of metal that are encapsulated.

Applicant's claimed method meets the requirements of 35 U.S.C. § 103(a) in view of Bayer. Applicant respectfully request reconsideration and withdrawal of the final rejection.

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SUMMARY AND CONCLUSION

All rejected claims have been cancelled, with the exception of Claims 21 and 26 which have been amended as discussed during the telephone interview on June 11, 2003. The claims objected to have been amended, as suggested by the Examiner. In view of these amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned at (978) 341-0036.

Respectfully submitted,

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6/13/03

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MARKED UP VERSION OF AMENDMENTS

Claim Amendments Under 37 C.F.R. § 1.121(c)(1)(ii)

2. (Amended) [The method of Claim 1, further including the step of] A method for forming a metallized composite, comprising the steps of:
 - a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
 - b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite; and
 - c) injection molding a thermoplastic polymer at a surface of the metallized composite.
3. (Amended) [The method of Claim 1, further including the step of] A method for forming a metallized composite, comprising the steps of:
 - a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
 - b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite; and
 - c) blow molding a thermoplastic polymer at a surface of the metallized composite.
4. (Twice Amended) [The method of Claim 1, further including the step of] A method for forming a metallized composite, comprising the steps of:
 - a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
 - b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite; and
 - c) thermosforming the metallized composite.
5. (Twice Amended) [The method of Claim 1, further including the step of] A method for forming a metallized composite, comprising the steps of:
 - a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
 - b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite; and

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- c) vacuum-forming the metallized composite.
- 8. (Amended) [The method of Claim 7, wherein] A method for forming a metallized composite, comprising the steps of:
 - a) depositing a metal on a first thermoplastic layer by electron beam evaporation to form a discontinuous layer of said metal that includes indium, said discontinuous layer including discrete islands of metal; and
 - b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite [is deposited on the first thermoplastic layer].
- 15. (Amended) [The method of Claim 14, wherein said first and second thermoplastic layers bond] A method for forming a metallized composite, comprising the steps of:
 - a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
 - b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite; and
 - c) bonding said first thermoplastic layer to said second thermoplastic layer by at least partially melting said layers, whereby said layers become a continuous thermoplastic sheet.
- 18. (Amended) [The method of Claim 17, further including the step of] A method for forming a metallized composite, comprising the steps of:
 - a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
 - b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite;
 - c) bonding said first thermoplastic layer to said second thermoplastic layer by depositing an adhesive on said discontinuous layer of metal and said first thermoplastic layer prior to laminating said second thermoplastic layer onto the discontinuous layer; and
 - d) curing said adhesive by exposure to ultraviolet light.
- 20. (Amended) [The method of Claim 19, further including the step of] A method for forming a metallized composite, comprising the steps of:
 - a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;

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- b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite;
- c) bonding said first thermoplastic layer to said second thermoplastic layer by depositing an adhesive on said second thermoplastic layer prior to laminating the second layer onto the discontinuous layer, whereby said adhesive is trapped between said first and second thermoplastic layers of the metallized sheeting; and
- d) curing the adhesive by exposing to ultraviolet light.

21. (Amended) [The method of Claim 1, wherein said metal is deposited on said first thermoplastic layer] A method for forming a metallized composite, comprising the steps of:

- a) depositing a metal on a first thermoplastic layer to transfer said metal from a substrate applied to said first layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal; and
- b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite, wherein said discrete islands of metal are encapsulated by said thermoplastic layers,

22. (Amended) [The method of Claim 1, further including the step of] A method for forming a metallized composite, comprising the steps of:

- a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
- b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite; and
- c) embossing said metallized composite.

23. (Amended) [The method of Claim 1, further including the step of] A method for forming a metallized composite, comprising the steps of:

- a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
- b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite; and
- c) folding said metallized composite.

26. (Amended) [The method of Claim 1, further including] A method for forming a metallized composite, comprising the steps of:

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- a) depositing a metal on a first thermoplastic layer to form a discontinuous layer of said metal, said discontinuous layer including discrete islands of metal;
- b) laminating a second thermoplastic layer onto said discontinuous layer to form said metallized composite, wherein said discrete islands of metal are encapsulated by said thermoplastic layers;
- c) depositing a metal onto the metallized composite to form a second discontinuous layer of metal; and
- [b)] d) laminating a third thermoplastic layer onto said second discontinuous layer.